

Appl. No. 09/804,522

Amnt. dated 9/26/05

Reply to Office Action of Apr 27, 2005

This listing of claims will replace all prior versions, and listings, of the claims in the application:

Listing of Claims:

Claim 1 (currently amended). An LED illumination source device and a detection element for use in a flow particle detection device comprising:

an LED for providing light at a selected wavelength; and

an optical element for collecting nearly all of the light from the LED and
s concentrating the selected light at a selected volume within a flow stream-;
and

a detector for detecting fluorescent light from the flow stream resulting from the light from the LED illumination source.

Claim 2 (original). The device of claim 1, wherein the optical element comprises:

a collecting element having a small focal length for collecting the light from the LED and substantially collimating it to a roughly parallel beam of light; and

a focussing element for focussing the collimated beam.

Claim 3 (original). The device of claim 1 wherein the collecting element is a ball lens.

Claim 4 (original). The device of claim 1 wherein the LED is a composite LED which generates light at two wavelengths.

Claim 5 (previously amended). The device of claim 1 wherein the LED is a side emitting, flat pack, lensless LED.

Claim 6 (original). The device of claim 1 wherein the flow particle detection device is a flow cytometer.

Claim 7 (currently amended). Particle detection apparatus for identifying particles in a sample stream moving through a flow zone, the sample stream containing target particles, the apparatus comprising:

equipment for passing the sample stream through the flow zone;

- 5 an illumination device for illuminating the sample stream within the flow zone;
and

a detector assembly for detecting fluorescent light emitted ~~or scattered~~ from illuminated target particles within the flow zone as a result of illumination from the illumination device;

- 10 wherein the illumination device ~~includes~~ consists substantially of an LED illumination source device including -

an LED for providing light at a selected wavelength; and

an optical element for collecting nearly all of the light from the LED and concentrating the collected light at a selected volume within a flow sample
15 stream.

Claim 8(original). The apparatus of claim 7 wherein the optical element comprises:

- 5 a collecting element having a small focal length for collecting nearly all of the light from the LED and substantially collimating it to a parallel beam of light; and
a focussing element for focussing the collimated beam.

Claim 9(original). The apparatus of claim 8 wherein the collecting element is a ball lens.

Claim 10(original). The apparatus of claim 7 wherein the LED is a composite LED which generates light at two wavelengths.

Claim 11(currently amended). The apparatus of claim 10 wherein the detector detects light ~~emitted or scattered~~ fluoresced from illuminated target particles resulting from illumination at both selected wavelengths within the flow zone.

Claim 12(original). The apparatus of claim 11, wherein the sample stream includes two fluorescent dyes and the selected wavelengths cause the two dyes to emit at different wavelengths.

Claim 13(original). The apparatus of claim 7 wherein the particle detection apparatus is a flow cytometer.

Claim 14 (currently amended). Particle detection apparatus for identifying particles in a sample stream moving through a flow zone, the sample stream containing target particles, the apparatus comprising:

equipment for passing the sample stream through the flow zone;

an illumination device for illuminating the sample stream within the flow zone with two selected wavelengths; and

a detector assembly for detecting fluorescent light emitted ~~or scattered~~ from illuminated target particles resulting from illumination from the illumination device at both selected wavelengths within the flow zone;

wherein the illumination device ~~includes~~ consists substantially of an LED illumination source device including -

an LED for providing light at the two selected wavelengths; and

an optical element for collecting nearly all of the light from the LED and concentrating the collected light at a selected volume within a flow sample stream.

Claim 15(original). The apparatus of claim 14, wherein the detector assembly comprises two detectors for detecting emitted light at two wavelengths.

Claim 16(original). The apparatus of claim 14, wherein the sample stream includes two fluorescent dyes and the selected wavelengths cause the two dyes to emit at different wavelengths.

Claim 17(original). The apparatus of claim 16, wherein the detector assembly comprises two detectors for detecting emitted light at the two wavelengths.

Claim 18(original). The apparatus of claim 14 wherein the optical element comprises:

a collecting element having a small focal length for collecting nearly all of the light from the LED and substantially collimating it to a roughly parallel beam of light; and

a focussing element for focussing the collimated beam.

Claim 19(original). The apparatus of claim 18 wherein the collecting element is a ball lens.

Claim 20(original). The apparatus of claim 14 wherein the particle detection apparatus is a flow cytometer.

Claim 21(new). Particle detection apparatus for identifying particles in a sample stream moving through a flow zone, the sample stream containing target particles, the apparatus comprising:

equipment for passing the sample stream through the flow zone;

- 5 an illumination device for illuminating the sample stream within the flow zone;
and

a detector assembly including means for -

(a) detecting the presence of illuminated target particles within the flow zone, and

- 10 (b) measuring properties of the particles based upon fluorescent light emitted from the particles as a result of illumination from the illumination device,

wherein the illumination device consists substantially of an LED illumination source device including -

- 15 an LED for providing light at a selected wavelength; and

an optical element for collecting nearly all of the light from the LED and concentrating the collected light at a selected volume within a flow sample stream.

Claim 22(new). The apparatus of claim 21 wherein the collecting element is a ball lens.

Claim 23(new). The apparatus of claim 21 wherein the LED is a composite LED which generates light at two wavelengths.

Claim 24(new). The apparatus of claim 23 wherein the detector detects light fluoresced from illuminated target particles resulting from illumination at both selected wavelengths within the flow zone.

Claim 25(new). The apparatus of claim 24, wherein the sample stream includes two fluorescent dyes and the selected wavelengths cause the two dyes to emit at different wavelengths.

Claim 26(new). The apparatus of claim 21 wherein the particle detection apparatus is a flow cytometer.